Rice-USP Innovative Research Consortium 2019-2020
Faculty and Areas of Interest for Undergraduate Research Collaboration

1. Adrienne Simões Correa
Assistant Professor Biosciences
Department of Biosciences
Number of students =1

Possible area of research:
Microbial and molecular ecology of coral reefs, mangroves and salt marsh ecosystems.

2. Anatoly Kolomeisky
Professor, Chemistry, Chemical & Biomolecular Engineering, Associate Chair for Graduate Studies
Chemistry
Number of students = 1

Possible research areas:
- Understanding mechanism of collective behavior of motor proteins
- Dynamics of protein-DNA interactions
- Multi-particle non-equilibrium phenomena

3. José Nelson Onuchic
Harry C. & Olga K. Wiess Professor of Physics, Co-Director: Center for Theoretical Biological Physics, Professor of Chemistry + BioSciences
Physics and Astronomy
Number of students = up to 2

Possible research area:
Theoretical physics has an increasingly essential role to play in understanding the set of interwoven complex phenomena that constitute living systems. The Center for Theoretical Biological Physics (CTBP) has long had a critical role in creating this new reality. CTBP vision is that we can combine our increasingly sophisticated understanding of biomolecule-based information processing in cells and tissues with recently developed concepts of self-organization by active materials to create a new paradigm of living systems as smart matter.

4. Matteo Pasquali
A. J. Hartsook Professor, Professor, Chemistry and Materials Science & NanoEngineering,
Department of Chemical & Biomolecular Engineering

Possible research areas:

- rheology and soft phases of carbon nanotubes
- fiber spinning and processing of carbon nanotubes
- liquid crystals of nanotubes

- doping and properties of carbon nanotube conductors

05. Pedro Alvarez
George R. Brown Professor, Professor of Materials Science and NanoEngineering; Civil & Environmental Engineering
Number of students = up to 2

Possible research areas:
- Nanotechnology-enabled water treatment
- Remediation of sites contaminated with hazardous materials

06. Randy Hulet
Fayez Sarofim Professor of Physics
Physics and Astronomy
Number of students = 1

Possible research areas:
We study atoms cooled to the ultra-low temperature regime of a few nano-Kelvin. We have two main thrusts: 1) strongly correlated fermion physics and 2) matter wave solitons of attractively-interacting bosons. In the first area, we emulate an electronic material using optical lattices to study high-temperature superconductors. In the second area, we confine a Bose-Einstein condensate to 1 dimension to better understand the nonlinear dynamics of solitons.

07. Rebecca Richards-Kortun
Malcolm Gillis University Professor, Prof of Bioengineering, Prof of Elec & Comp Engr, Special Adviser to the Provost, Director of Rice 360: Institute for Global Health Technology
Bioengineering
Number of students = up to 2- minimum stay 6 months

Possible research area:
Early cancer detection: To improve early detection and prevention of cancer, we are developing a new generation of high-performance, low-cost, optical imaging technologies. These technologies enable in vivo imaging of tissue with subcellular resolution, allowing immediate diagnostic evaluation at the point of care. We work with clinical collaborators to translate these technologies to clinical settings in the United States and elsewhere in the world (including Brazil) for early diagnosis of oral cancer, esophageal cancer, and cervical cancer.

Point-of-care diagnostics: We are developing molecular specific contrast agents, optical micro-fluidic chips, and rapid diagnostic tests to improve point-of-care detection of infectious diseases in low-resource settings. Applications include tests for tuberculosis, malaria, HPV, sickle cell anemia, and sepsis, as well as tests to evaluate complete blood count, hemoglobin, and bilirubin levels.

08. Scott Egan
Assistant Professor of Ecology & Evolutionary Biology
Department of Biosciences
Number of students =1 or 2

Possible research areas:
The Egan lab is broadly interested in addressing important questions in ecology, evolution, and conservation biology. To address these questions, we use a multidisciplinary approach that integrates population genetics and genomics, natural history, behavioral observations, and manipulative field experiments. In addition, we collaborate with other scientists from across the science spectrum to address these questions in creative and new ways. (See our website for specific projects.) One major theme of the lab is studying the processes that promote or constrain the evolution of new biological species. Our work aims to: (1) understand the role of adaptation via natural selection in the speciation process, and (2) explore genomic architecture that mediates the evolution of new species. We also work on more applied genetic interdisciplinary research that harnesses genetic variation to address societal challenges, such as the rapid environmental detection of rare or invasive species. Egan lab website: https://sites.google.com/site/scottpegan/.

09. Andre Droxler
Professor, Earth Sciences
Earth Sciences
Number of students = 1

Possible research areas:
Uniquely productive Microbial (reef) carbonate oil reservoirs have been discovered offshore Brazil in the past decade and, therefore, our research in Central Texas has triggered interests from oil and gas companies involved in the offshore Brazil exploration.

10. Alida Metcalf
Professor of History
Department of History
Number of students =1 or 2 (background in History, Architecture or Urban Studies)

The imagineRio project at Rice University is an illustrated diachronic atlas of the history of Rio de Janeiro developed by Professors Farés el-Dahdah and Alida Metcalf. The platform enhances a time-sensitive digital map of the city with historical visual documents, such as maps, plans, and views of the city. Students interested in working with historical maps, urban plans, and iconography of the city--in the form of photographs, paintings, drawings--may use imagineRio to further their own research. Topics of interest are: urban life; slavery; city planning; family life; environmental change; economic development, etc. Students who work with imagineRio will learn basic GIS skills in ArcMap Pro, as well as how to work with the image databases ArtStor. Students will learn how to georeference historical maps and how to geocode visual documents.

11. Farès el-Dahdah
Professor of the Humanities
Number of students = up to 2 (background in History, Architecture, Urban Studies)
Possible research areas:
Students from USP are invited to work on the "imagineRio Project," an online atlas that illustrates the social and urban evolution of Rio de Janeiro over the entire history of the city, as it existed and as it was often imagined [for more info, visit: http://hrc.rice.edu/imagineRio/]. Applicants should have experience working with geospatial technologies (e.g., ArcMap, ArcGISPro, QGIS) or 3D modeling software (e.g., CityEngine).

12. Andrea Balestero
Assistant Professor Anthropology
Department of Anthropology
Number of students =1 or 2

My work looks at the different ways water is understood by Latin American government officials, activists, and everyday citizens. I am particularly interested in spaces where the law, economics and techno-science are so fused that they appear as one another. I am currently involved in a project that examines the politics of aquifers and the clashes between community, scientific, and legal understandings of underground water. I would be interested in hosting students interested in water, science and technology studies, and/or the politics of water.

13. Daniel Domingues da Silva
Assistant Professor of History
Department of History
Number of students =up to 2 students

Possible Area of Research:
Selected candidates will join the African and African Diaspora workshop of the Department of History to help develop a number of research projects on the history of Africa and the transatlantic slave trade. They will gain hands-on experience in history research by participating of nearly every step of a project in the field, including writing grant applications, collecting data from primary sources, analyzing research data, and reporting research results in the form of publications, presentations, posters, websites, etc.